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IV. *An Addition to the Description of the Art of Living under Water, publish'd in Phil. Transact. No. 349. By the same.*

IN No. 349. of the *Philosophical Transactions*, I did, as I suppose, sufficiently explain the Method I had practiced and found effectual to furnish Air at any reasonable Depth under Water, and in any quantity desired, for the Subsistence of men that shall have occasion to work on Wrecks, or otherwise at the bottom, under a great Pressure of Water. This I did by means of the Diving-Bell, which, being from time to time replenished with fresh Air, I had found sufficient to maintain five Men for near two Hours together in ten fathom Water, without the least Hurt or Inconvenience. But the Bell being not to be moved from place to place, but by moving the Vessel from which it hung suspended, was a great Impediment to the Work that was to be done below; and therefore I bethought my self how to enable the Diver to go out from the Bell to a considerable distance, and to stay a sufficient time without it, with full freedom to act as occasion served. And considering that the Pressure being greater on the Surface of the Water in the Bell, than on any other Surface that was higher than it, the Air would by a Pipe pass from the Bell into a Cavity of Air over that higher Surface; I concluded, that putting on a Cap of Lead made weighty enough to

nk empty, and in form resembling the Bell it self, I might by flexible Pipes, which a man might carry coiled on his Arm, receive a constant Stream of Air from the Magazine thereof in the great Bell, so long as the Surface of the Water in the Caps was above the Level of that in the Bell.

Following this Idea, I procured Pipes to be made, which answered all that was hoped from them. They were secured against the Pressure of the Water, by a spiral brass Wire, which kept them open from end to end, the Diameter of the Cavity being about the sixth part of an Inch. These Wires we coated with thin Glove-leather, curiously sowed on, and then dipt the Leather into a Mixture of Oyl and Bees-Wax hot, which, filling up the Pores of the Leather, made it impenetrable to Water. Then we drew several Folds of Sheeps Guts over them, which when dry, we painted with a good coat of Paint, and then secured the whole with another coat of Leather, to keep them from fretting. The Pipes of which we made several, were much about forty Foot long, the size of a half Inch Rope; the one end thereof being fixt in the Bell, at some height above the Water, and the other end fastned to a Cock, which opened into the Cap. The use of the Cock being to stop the return of the Air, whenever there was occasion to stoop down, or go below the Surface of the Air in the Bell, which was necessary as often as there was occasion to go out or return into the Bell.

The Diver therefore putting on his Cap, and coyling his Pipe on his Arm, like a Rope, as soon as he is discharged from the Bell, opens his Cock, and marches on the bottom of the Sea, vearing out the
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Coiles of his Pipe, which serve as a Clue to direct him back again : and this I have seen practised, without any ill Incident attending it.

But there are two things to be remark'd in this affair ; first, That the Weight of a Man being very little more than that of his Bulk in Water, he cannot act with any Strength, nor stand with any Firmity, especially where any thing of a Stream runs, without a considerable addition of Weight ; and therefore the leaden Caps were made to weigh about half a hundred weight, to which I added a Girdle of large Weights of Leads, of about the same Weight in the whole, this being to be worn about the Waist ; and two Clogs of Lead for the Feet, of about 12 pound each. With this Accession of Weight I found a Man could stand well in an ordinary Stream, and even go against it. The other thing necessary to be provided against, was the Cold of the Water, which though it could not be wholly taken off, so that a Man could endure it long, yet it was much eased by Habits of Wastecoat and Drawers, made close to the Body, of that thick sort of woollen Stuff they make Blankets of : This being full of Water, would be a little warm'd by the Heat of the Body, and keep off the Chill of new cold Water coming on it.

As to Sight under Water, as long as the Water is not turbid, things are seen sufficiently distinct ; but a small degree of Thickness makes perfect Night, in no great depth of Water : In my leaden Caps, which from their use I call'd *Caps of Maintenance*, I at first fixt a plain Glass before the Sight, but soon found that the Vapour of the Breath would make such a Dew on the Surface of the Glass, that it hindred

its Transparency : To remedy which, I found it necessary to prolong that Side of the Cap that was before the Eyes, and thereby enlarged the Prospect of what was under us.

V. *An Account of an Aurora Borealis, observed at Dublin, on Monday the sixth of February, 1720-1.* By J. W.

THE *Royal Society* having done me an unexpected Honour, in causing a short Account, which I sent 'em of the *Aurora Boreales*, that were seen the 10th and 24th of *November*, in the Year 1719, to be printed in their Journals ; I now present them with an Extract of what was observed on *Monday* the 6th of *February* last. The Air was all that Day, as it had been for some time before, very clear and sharp ; about half an Hour past four in the Evening, some flying Clouds appear'd, and the Sky was ting'd with a very unusual yellowish Colour, which perhaps might be reflected from a great Quantity of Snow, that soon after fell for near a quarter of an Hour. However that might be, I'm willing to date the beginning of the ensuing *Phanomena* from the first appearance of this uncommon Light. About a quarter past six, a thin Vapour, which was as yet very ill defin'd, and in all appearance resembl'd an exceeding black Cloud, had fix'd it self in the Northern *Hemisphere* ; its Edges were ting'd with a reddish Yellow, that by degrees, as it approach'd the
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